

FIG. 1

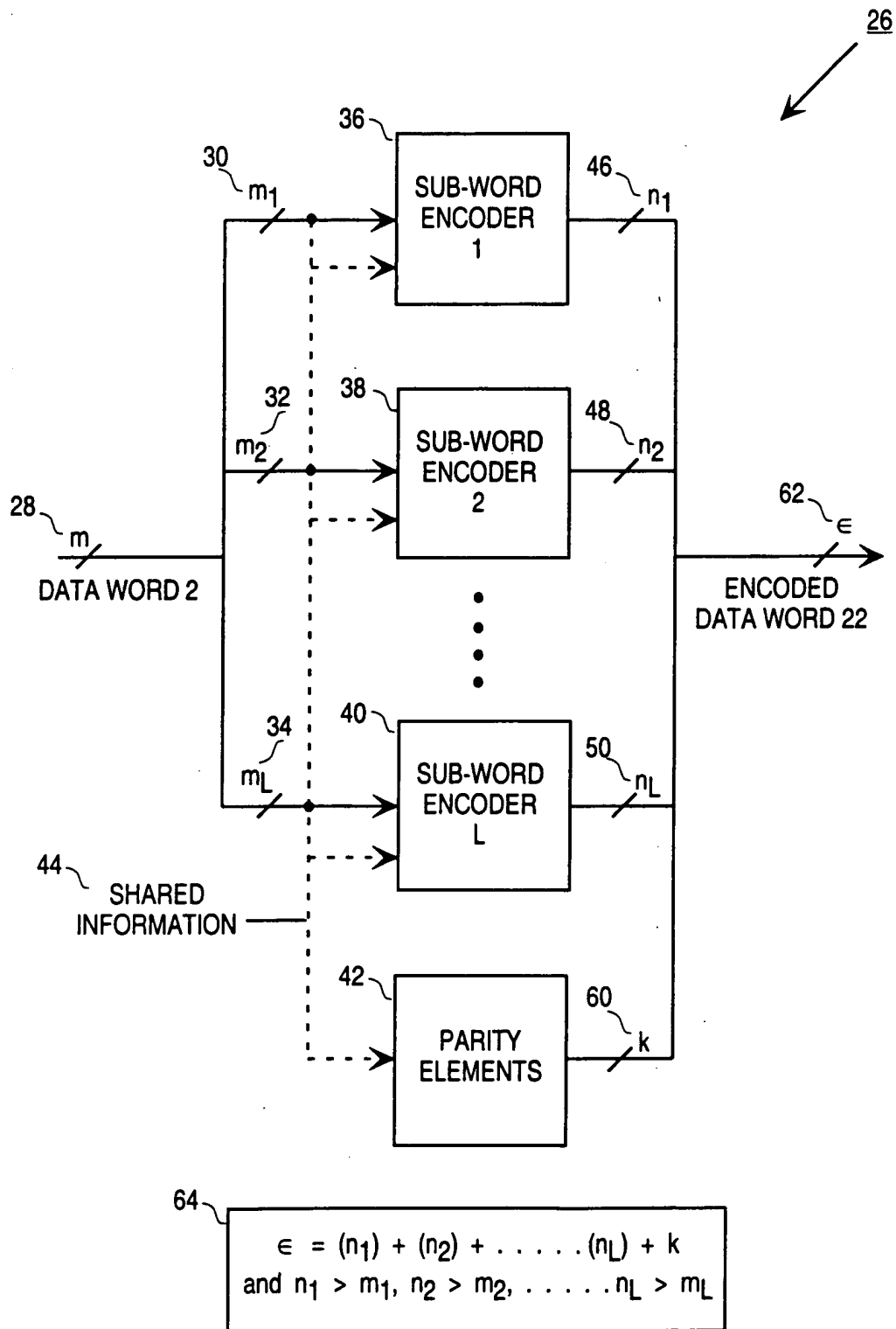


FIG. 2

FIG. 3

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NUMBER OF ENCODED LINES (n)	n = 1	1.	1.									
	n = 2	1.	2.	1.								
	n = 3	1.	3.	3.	1.							
	n = 4	1.	4.	6.	4.	1.						
	n = 5	1.	5.	10.	10.	5.	1.					
	n = 6	1.	6.	15.	20.	15.	6.	1.				
	n = 7	1.	7.	21.	35.	35.	21.	7.	1.			
	n = 8	1.	8.	28.	56.	70.	56.	28.	8.	1.		
	n = 9	1.	9.	36.	84.	126.	126.	84.	36.	9.	1.	
	n = 10	1.	10.	45.	120.	210.	252.	210.	120.	45.	10.	1.
		p=0	p=1	p=2	p=3	p=4	p=5	p=6	p=7	p=8	p=9	p=10

NUMBER OF ONES (P) IN AN ENCODED WORD

FIG. 4

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ENCODED WORD LENGTH	CODE STATES	INPUT WORD LENGTH	EXTRA LINES
3	2	1	2
4	6	2	2
5	10	3	2
6	20	4	2
7	35	5	2
8	70	6	2
9	126	6	3
10	252	7	3
11	462	8	3
12	924	9	3
13	1716	10	3
14	3432	11	3
15	6435	12	3
16	12870	13	3
17	24310	14	3
18	48620	15	3
19	92378	16	3
20	184756	17	3
21	352716	18	3

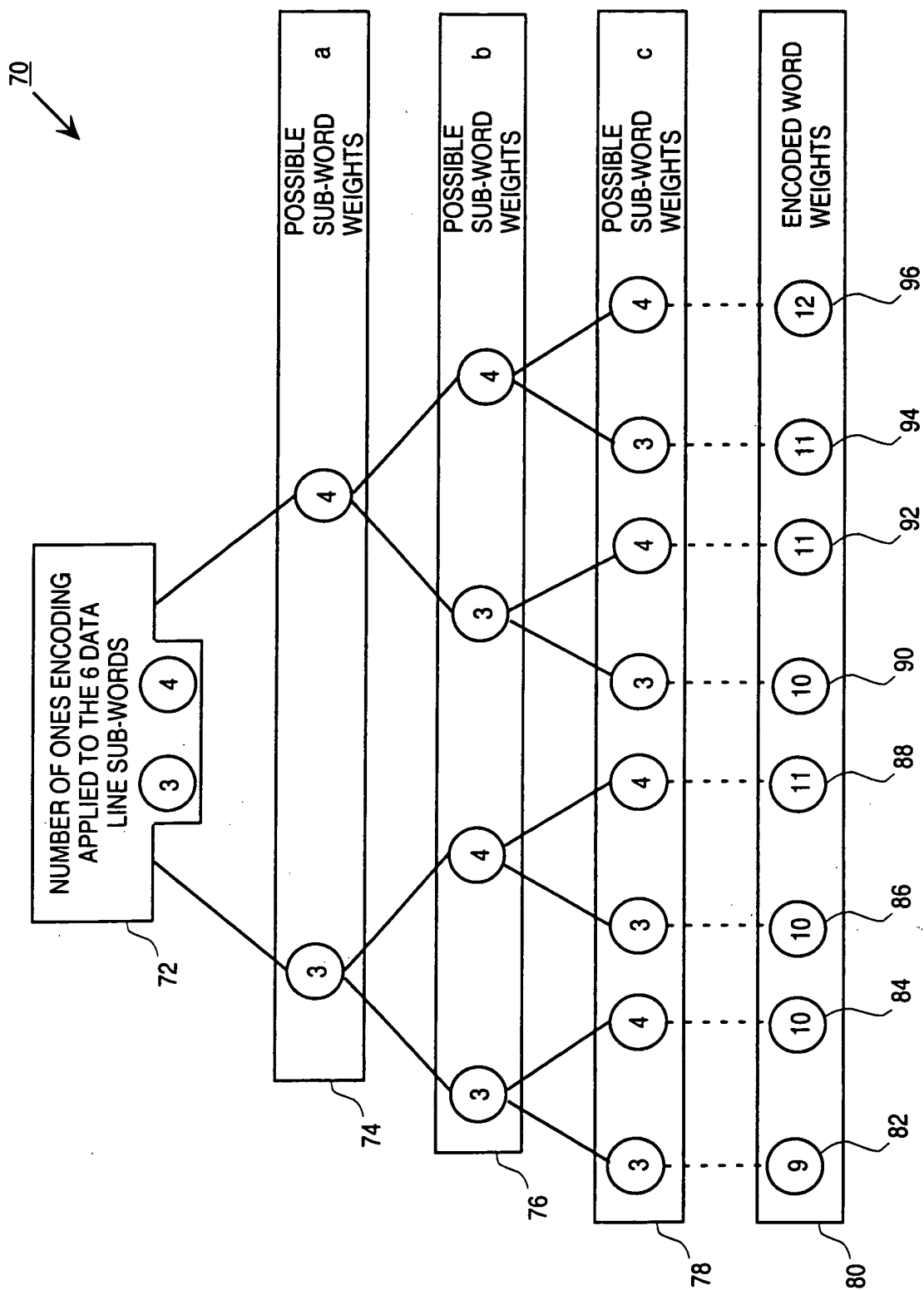


FIG. 5

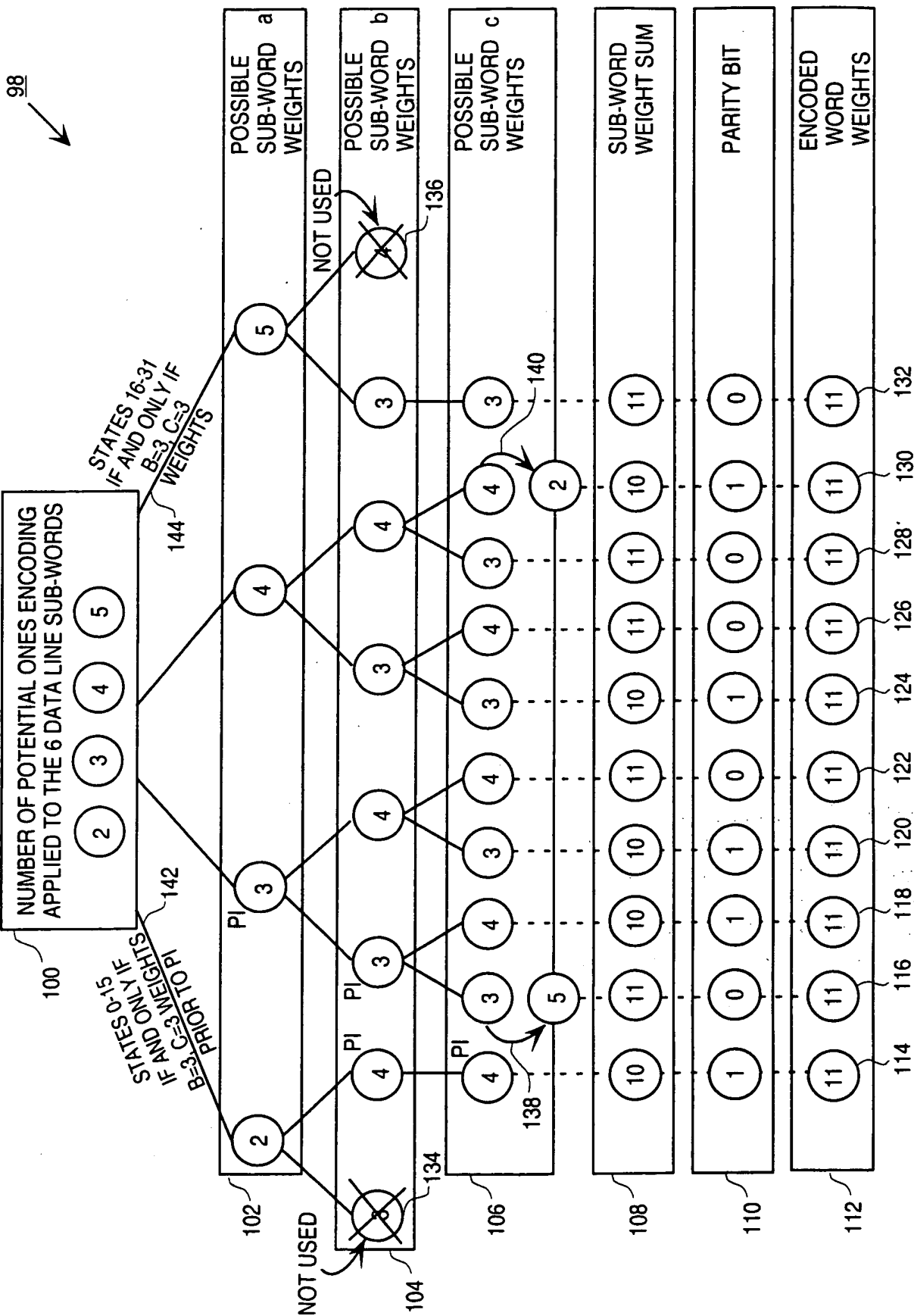


FIG. 6

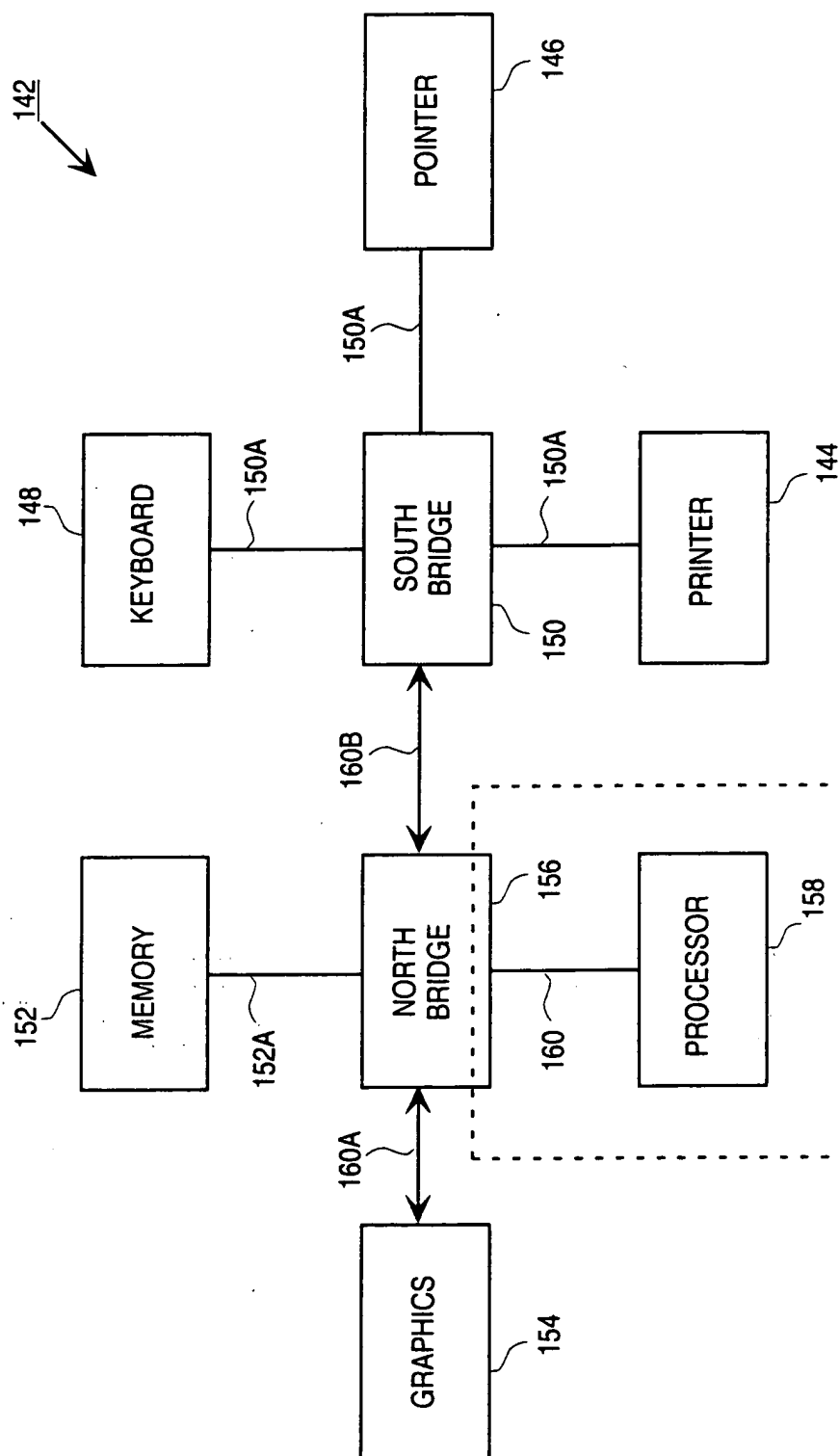


FIG. 7

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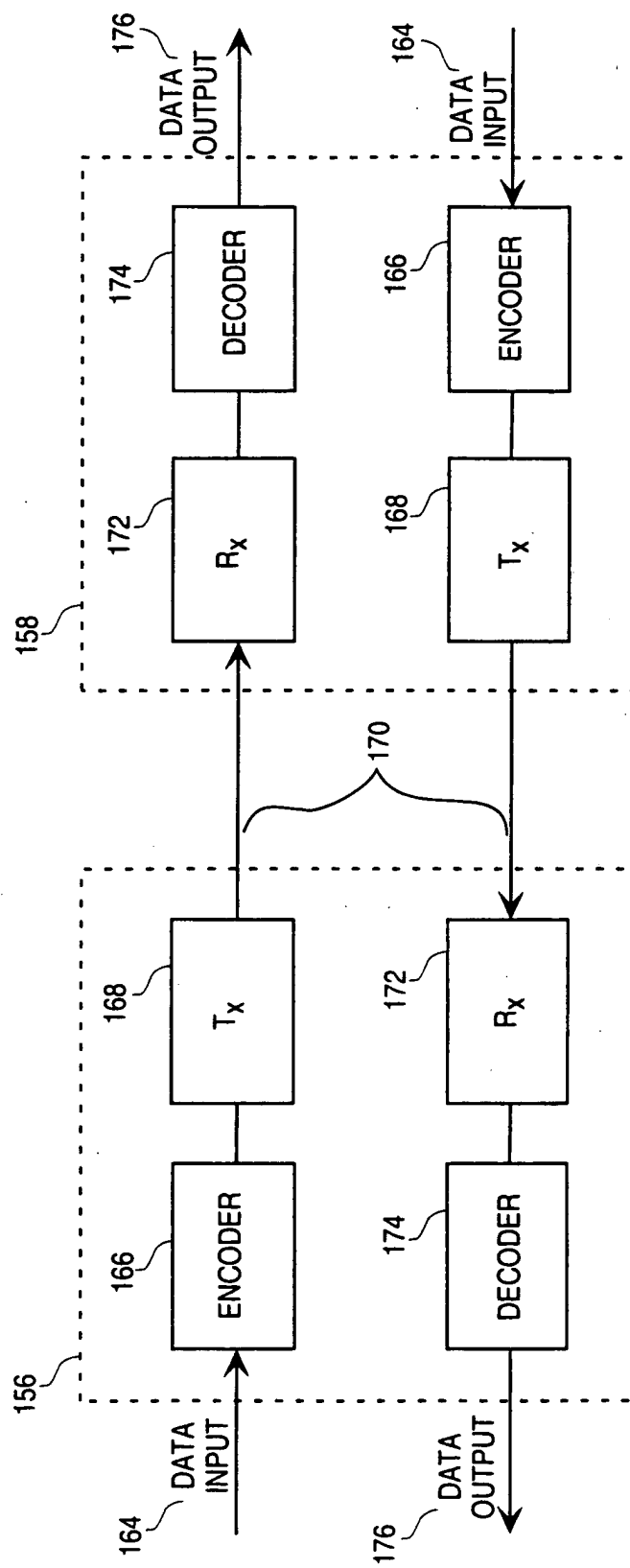
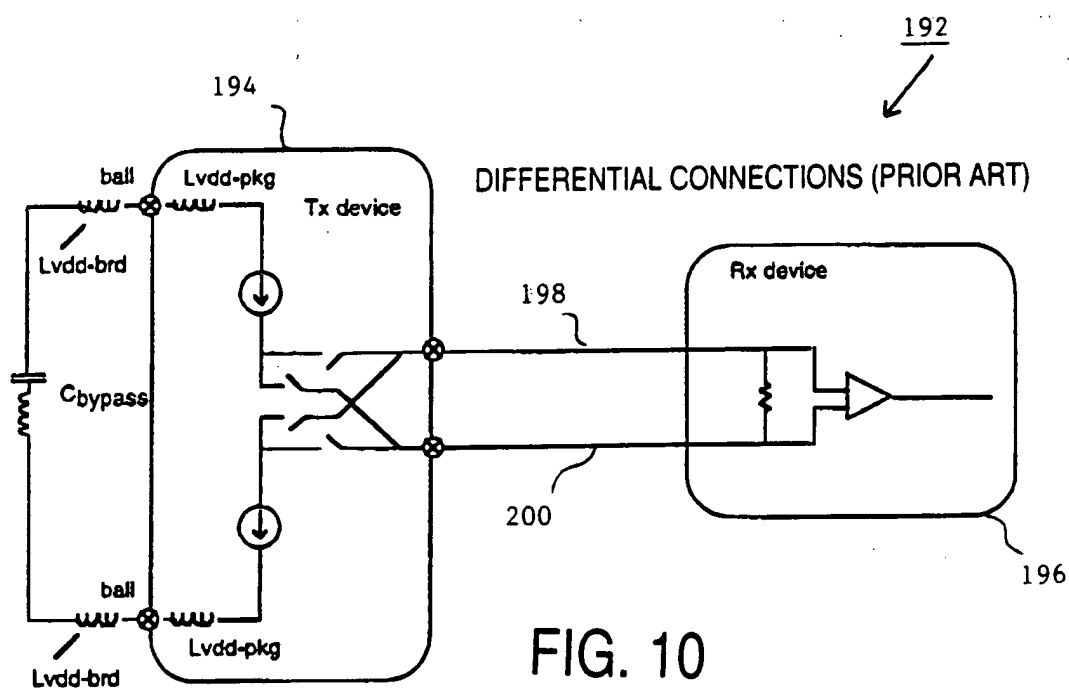
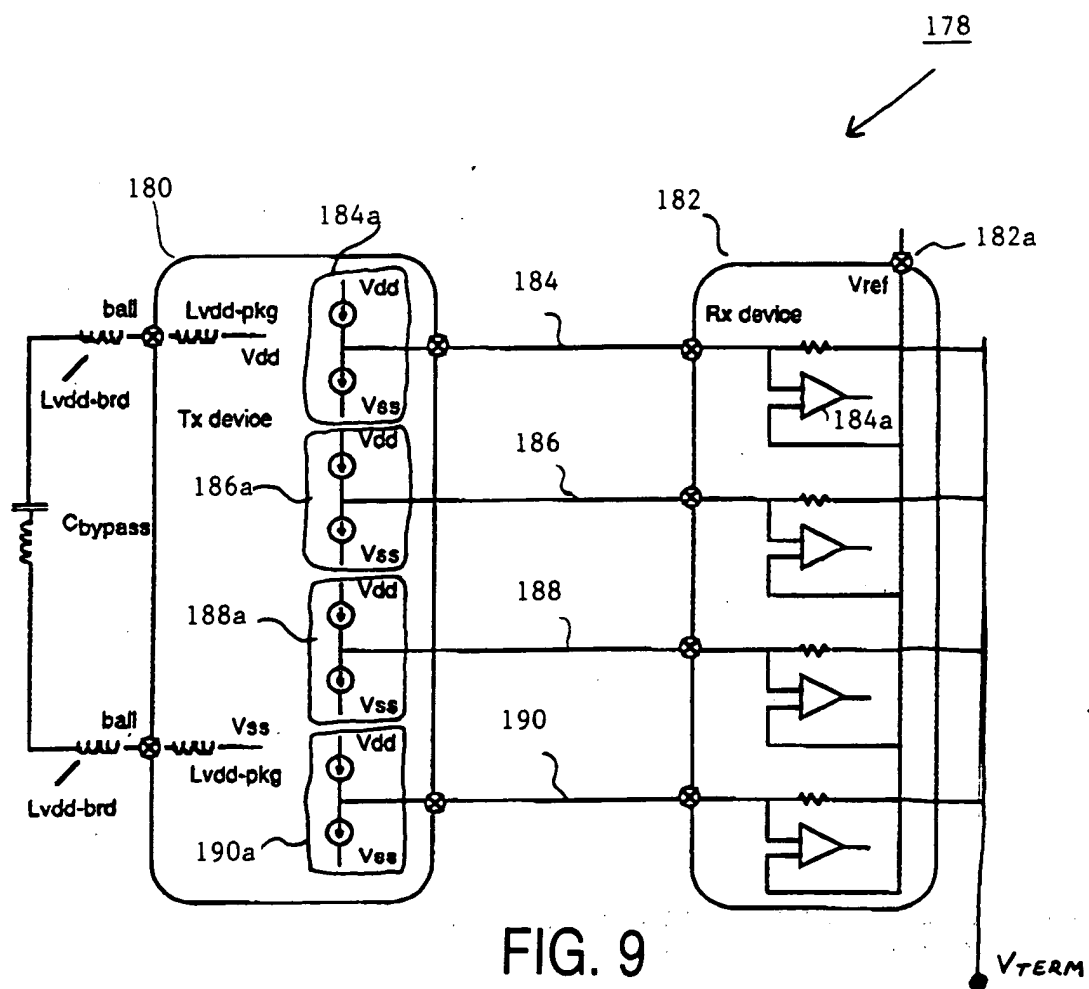


FIG. 8



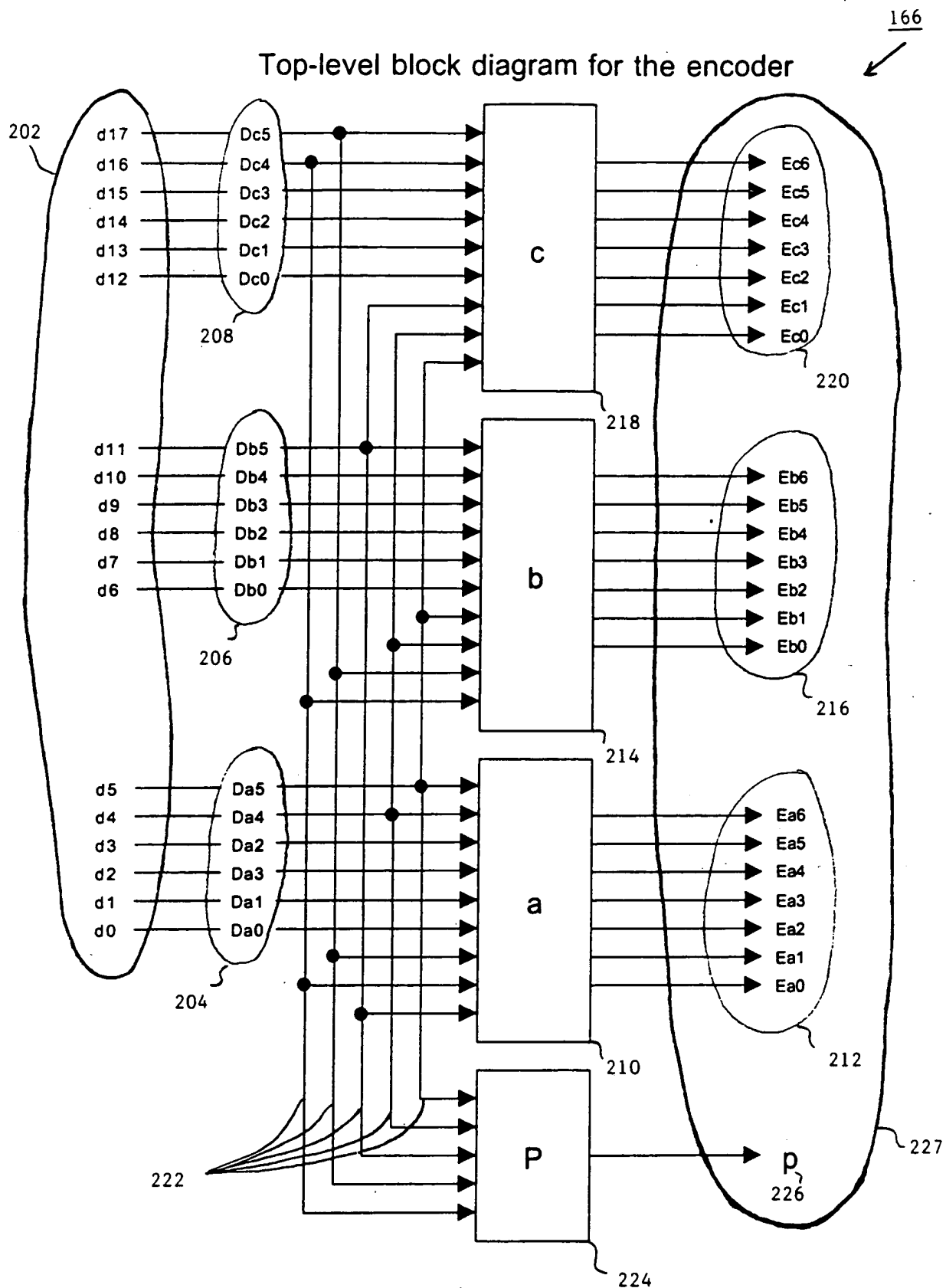


FIG. 11

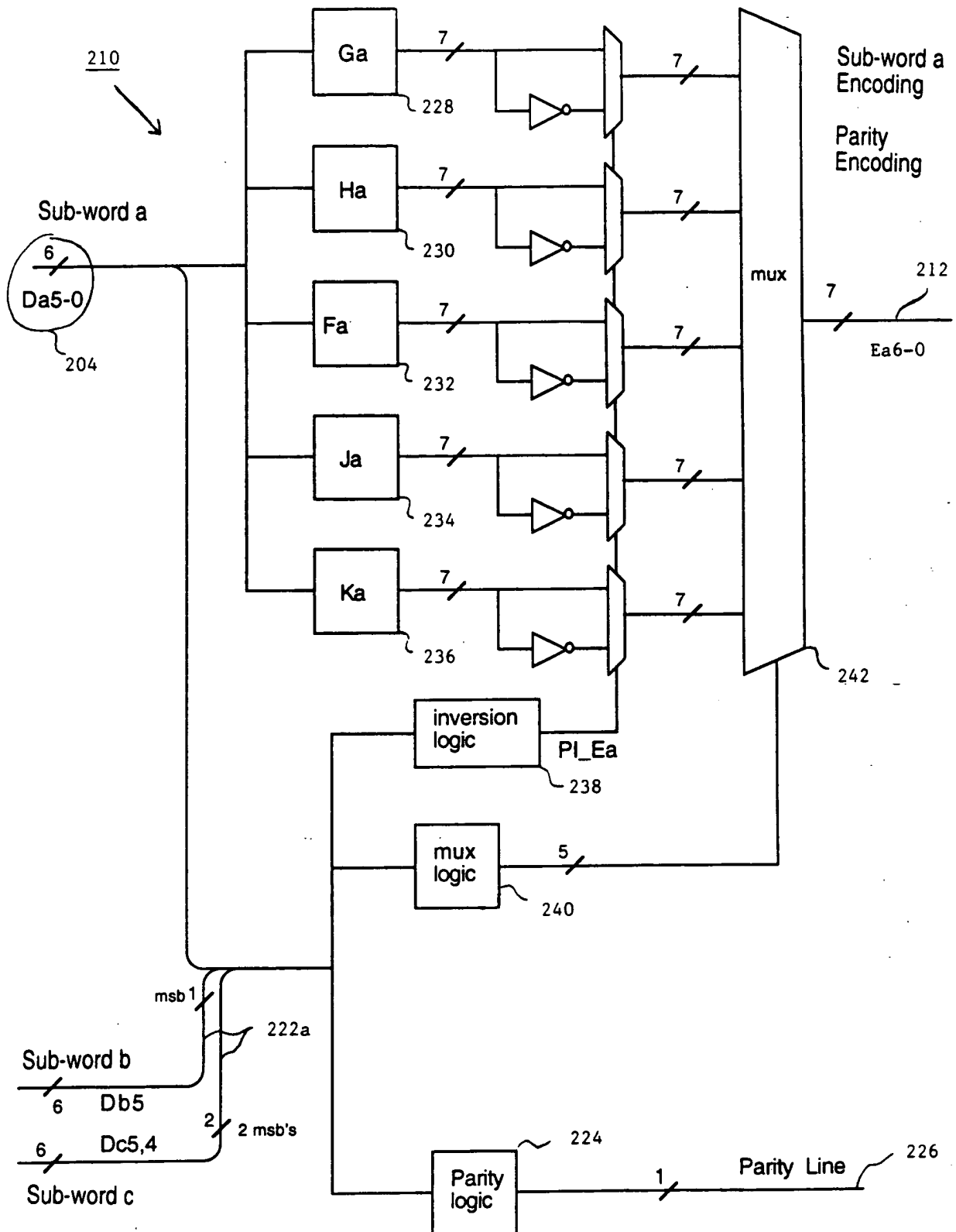


FIG. 12

Encode Truth Tables for Block Diagram Elements of Sub-word a

240a

Da5	Da4	Da3	Da2	Db5 + Dc5	Block
0	0	0	x	0	G
0	0	0	0	1	G
0	0	0	1	1	F1
0	0	1	x	x	J
0	1	0	x	0	K
0	1	0	x	1	J
0	1	1	x	0	H
0	1	1	x	1	K
1	0	0	x	x	J
1	0	1	x	x	K
1	1	0	x	x	K
1	1	1	0	x	F2
1	1	1	1	x	H

238a

Da5 · Db5 · Dc5 · Dc4	Pl Ea
0	no Inversion
1	Invert

224a

Da4	Da5	Db5	Dc5	Dc4	Parity Bit
0	0	0	0	x	1
1	0	0	0	x	0
x	0	0	1	x	1
x	0	1	0	x	1
x	0	1	1	x	0
x	1	0	0	x	1
x	1	0	1	x	0
x	1	1	0	x	0
x	1	1	1	0	1
x	1	1	1	1	0

234a

Da2	Da1	Da0	Ea4-0
0	0	0	10010
0	0	1	10001
0	1	0	01100
0	1	1	01010
1	0	0	01001
1	0	1	00110
1	1	0	00101
1	1	1	00011

Db5 + Dc5	Da4	Da3	Ea6	Ea5
0	x	x	0	0
1	x	0	1	0
1	x	1	1	0
1	0	x	1	1
1	1	x	0	0

228a

Da1	Da0	Ea4-0
0	0	10000
0	1	01000
1	0	00100
1	1	00010

Db5 + Dc5	Da2	Ea6	Ea5
0	0	0	1
0	1	1	0
1	x	1	1

230a

Da1	Da0	Ea4-0
0	0	11101
0	1	11011
1	0	10111
1	1	01111

Db5 + Dc5	Da2	Ea6	Ea5
0	0	0	1
0	1	1	0
1	x	0	0

232a

Da1	Da0	Ea4-0
0	0	11000
0	1	10100
1	0	01011
1	1	00111

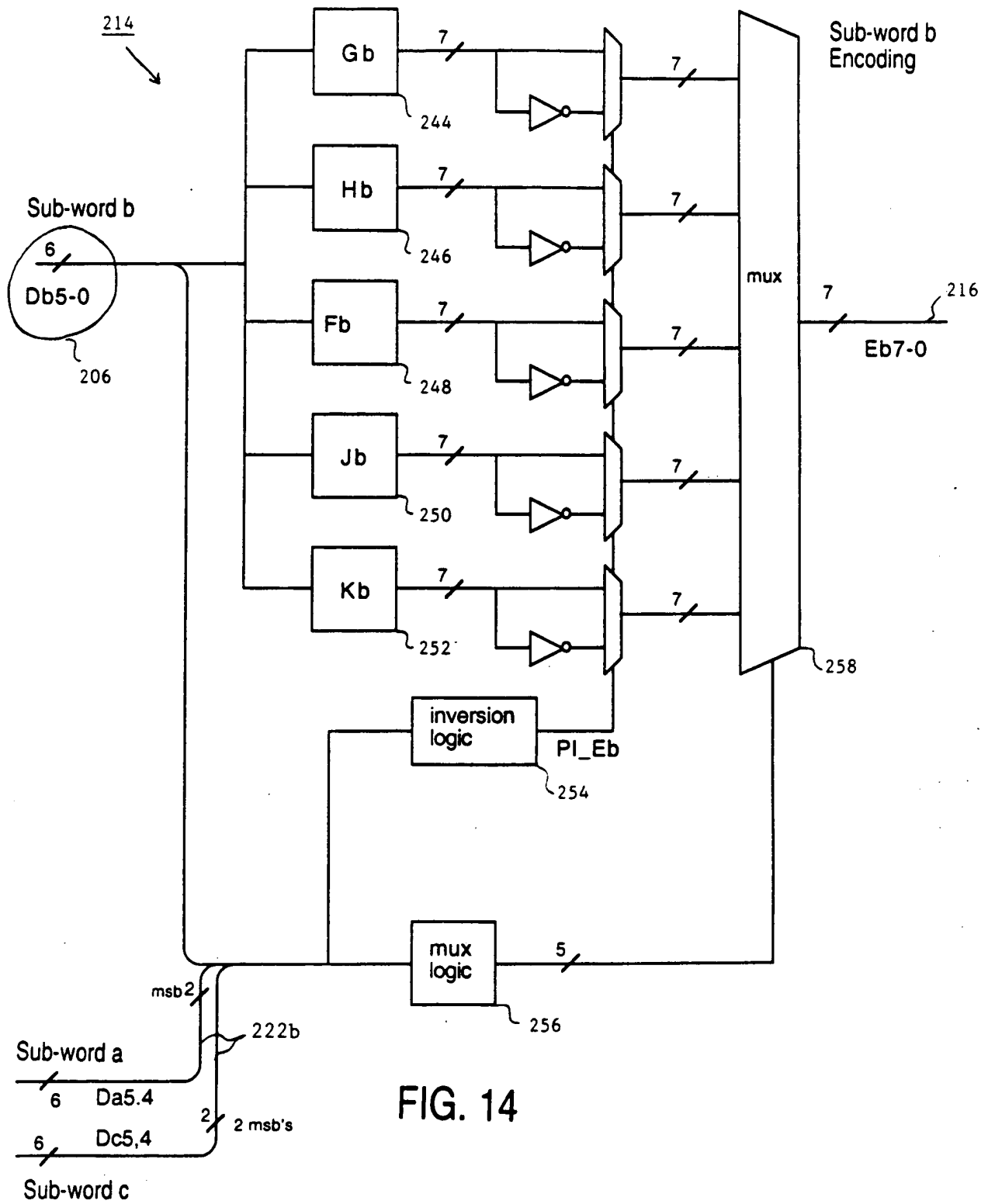
Da2	Da1	Ea6	Ea5
x	0	1	
x	1	0	
0	x		1
1	x		0

236a

Da2	Da1	Da0	Ea4-0
0	0	0	11100
0	0	1	11010
0	1	0	11001
0	1	1	10110
1	0	0	10101
1	0	1	10011
1	1	0	01110
1	1	1	01101

Da5	Da3	Ea6	Ea5
	0	1	1
	1	0	0
0	0	1	0
0	1	0	0
1	0	0	1
1	1	0	1

FIG. 13



Encode Truth Tables for Block Diagram Elements of Sub-word b

256b

Db5	Db4	Db3	Db2	Block
0	0	0	0	G
0	0	0	1	F1
0	0	1	x	J
0	1	0	x	J
0	1	1	x	K
1	0	0	x	J
1	0	1	x	K
1	1	0	x	K
1	1	1	0	F2
1	1	1	1	H

254b

Da4	Da5	Db5	Dc5	Dc4	P1 Eb
0	0	0	0	x	Invert
x	1	1	1	1	no inversion
x	1	1	1	1	Invert

244b

Db1	Db0	Eb4-0
0	0	10000
0	1	01000
1	0	00100
1	1	00010

always 1 for Gb

Eb6	Eb5
1	1

246b

Db1	Db0	Eb4-0
0	0	11101
0	1	11011
1	0	10111
1	1	01111

always 0 for Hb

Eb6	Eb5
0	0

248b

Db1	Db0	Eb4-0
0	0	11000
0	1	10100
1	0	01011
1	1	00111

Db2	Db1	Eb6	Eb5
x	0	1	
x	1	0	
0	x		1
1	x		0

250b

Db2	Db1	Db0	Eb4-0
0	0	0	10010
0	0	1	10001
0	1	0	01100
0	1	1	01010
1	0	0	01001
1	0	1	00110
1	1	0	00101
1	1	1	00011

Db4	Db3	Db6	Eb5
x	0		1
x	1		0
0	x	1	
1	x	0	

Db2	Db1	Db0	Eb4-0
0	0	0	11100
0	0	1	11010
0	1	0	11001
0	1	1	10110
1	0	0	10101
1	0	1	10011
1	1	0	01110
1	1	1	01101

Db4	Db3	Db6	Eb5
x	0		0
x	1		1
0	x	1	
1	x	0	

252b

FIG. 15

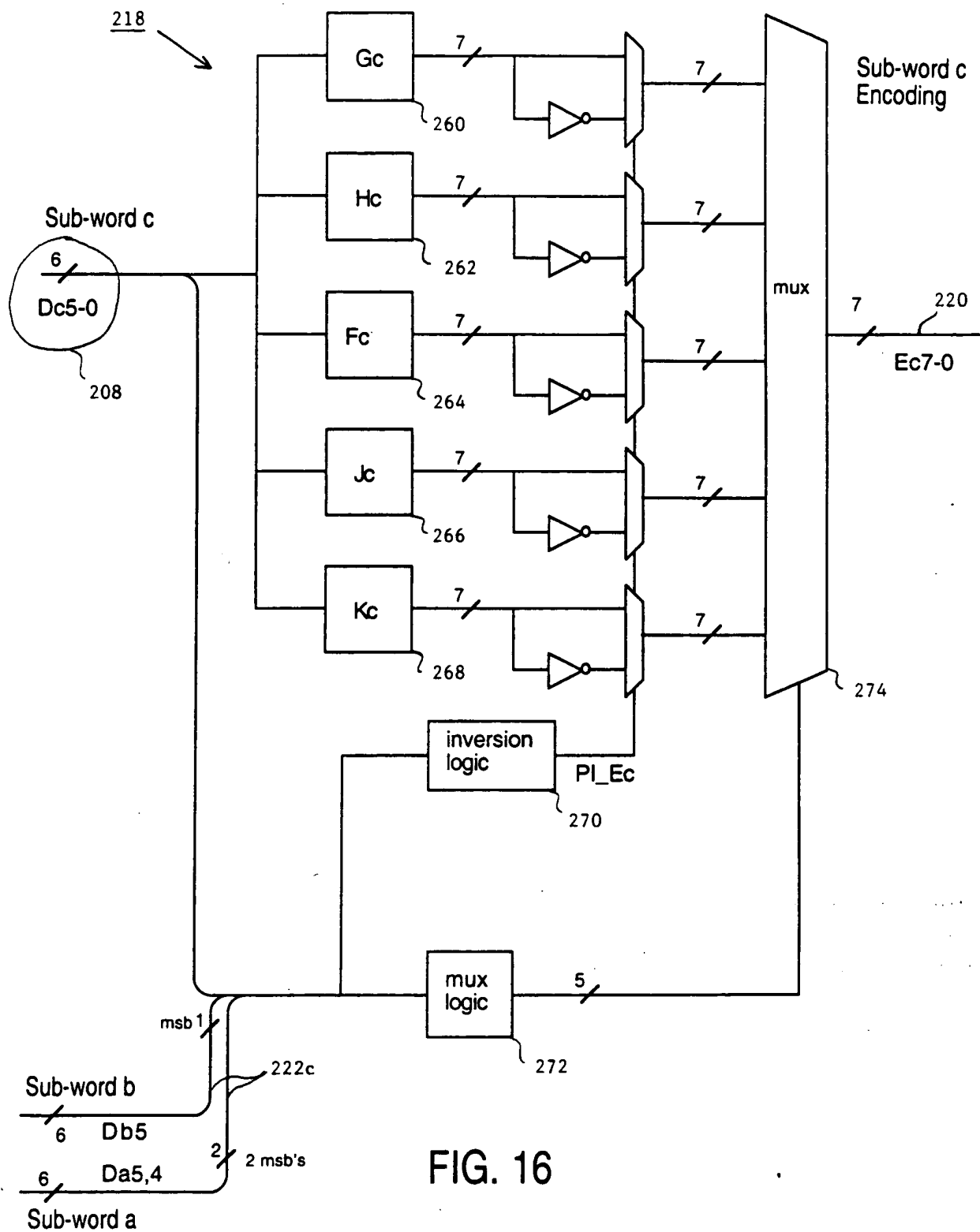


FIG. 16

Encode Truth Tables for Block Diagram Elements of Sub-word c

Subchannel c Mux Truth Table						Block
Dc5	Dc4	Dc3	Dc2	Da5:Db5		
0	0	0	0	x	G	
0	0	0	1	x	F1	
0	0	1	x	x	J	
0	1	0	x	x	J	
0	1	1	x	x	K	
1	0	0	x	0	J	
1	0	0	x	1	G	
1	0	1	x	0	K	
1	0	1	x	1	J	
1	1	0	x	x	K	
1	1	1	0	0	F2	
1	1	1	1	0	H	
1	1	1	1	1	H	

272c

Subchannel c Post Inversion Truth Table		
Da4+Da5+Da5+Dc5	P1	Ec
0		Invert
1		no Inversion

270c

Block Gc				
Dc1	Dc0	Ec4-0	Ec6	Ec5
0	0	10000		1
0	1	01000		
1	0	00100		
1	1	00010		
Dc5	Dc2	Ec6	Ec5	
0	0	1		
1	0	0		
1	1	0		

260c

Block Hc			
Dc1	Dc0	Ec4-0	
0	0	11101	
0	1	11011	
1	0	10111	
1	1	01111	

Da5:Db5	Dc2	Ec6	Ec5
0	x	0	0
1	0	0	1
1	1	1	0

262c

Block Fc			
Dc1	Dc0	Ec4-0	
0	0	11000	
0	1	10100	
1	0	01011	
1	1	00111	
Dc2	Dc1	Ec6	Ec5
x	0		1
x	1		0
0	x		
1	x		

264c

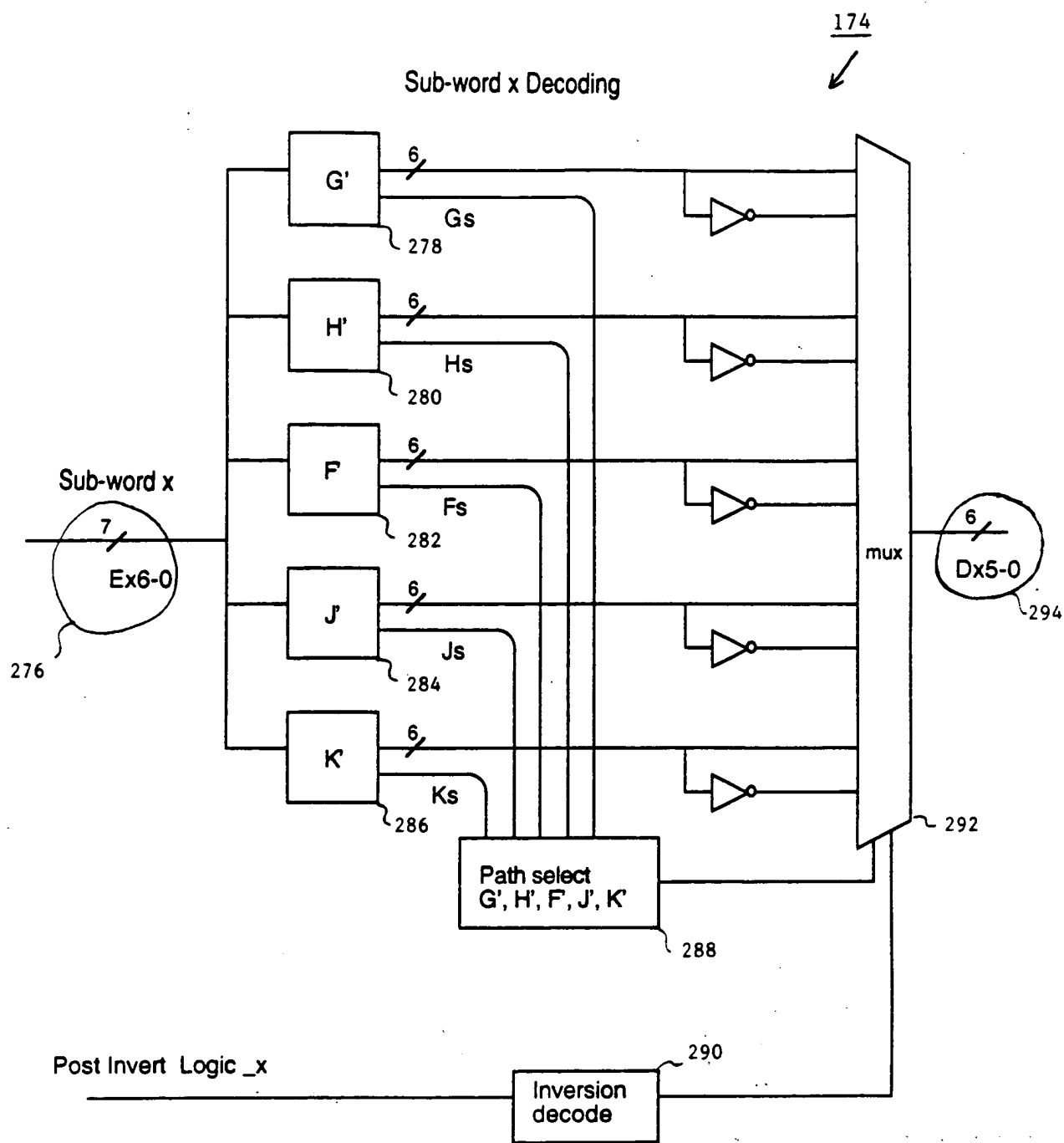
266c

Block Jc					
Dc2	Dc1	Dc0	Ec4-0	Ec6	Ec5
0	0	0	10010		
0	0	1	10001		
0	1	0	01100		
0	1	1	01010		
1	0	0	01001		
1	0	1	00110		
1	1	0	00101		
1	1	1	00011		
Dc5	Dc3	Ec6	Ec5		
	0		1		
0	0	0	0		
0	1	1	1		
1	0	0	1		
1	1	1	0		

Block Kc					
Dc2	Dc1	Dc0	Ec4-0	Ec6	Ec5
0	0	0	11100		
0	0	1	11010		
0	1	0	11001		
0	1	1	10110		
1	0	0	10101		
1	0	1	10011		
1	1	0	01110		
1	1	1	01101		
Da5:Db5	Dc4	Dc3	Ec6	Ec5	
0	x	0		0	
0	x	1		1	
0	0	x		1	
0	1	x		0	
1	x	x		1	

268c

FIG. 17



note: x is a, b, or c for respective sub-word

FIG. 18

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Truth Table for Sub-word a Decode

Decode Mux Truth Table Sub-word a													
Ea4-0	Decode Path Mux Control					Block	Da5		Da4	Da3	Da2	Da1	Da0
	Gas	Has	Fas	Jas	Kas								
10000	1	0	0	0	0	G'	0	0	0	Ea5_	0	0	278a
01000	1	0	0	0	0	G'	0	0	0	Ea5_	0	1	
00100	1	0	0	0	0	G'	0	0	0	Ea5_	1	0	
00010	1	0	0	0	0	G'	0	0	0	Ea5_	1	1	
11101	0	1	0	0	0	H'	Ea6_·Ea5_	1	1	Ea5_	0	0	280a
11011	0	1	0	0	0	H'	Ea6_·Ea5_	1	1	Ea5_	0	1	
10111	0	1	0	0	0	H'	Ea6_·Ea5_	1	1	Ea5_	1	0	
01111	0	1	0	0	0	H'	Ea6_·Ea5_	1	1	Ea5_	1	1	
11000	0	0	1	0	0	F'	Ea5	Ea5	Ea5	Ea5_	0	0	282a
10100	0	0	1	0	0	F'	Ea5	Ea5	Ea5	Ea5_	0	1	
01011	0	0	1	0	0	F'	Ea5	Ea5	Ea5	Ea5_	1	0	
00111	0	0	1	0	0	F'	Ea5	Ea5	Ea5	Ea5_	1	1	
10010	0	0	0	1	0	J'	Ea5·Ea6	Ea6_·Ea5	Ea5_	0	0	0	284a
10001	0	0	0	1	0	J'	Ea5·Ea6	Ea6_·Ea5	Ea5_	0	0	1	
01100	0	0	0	1	0	J'	Ea5·Ea6	Ea6_·Ea5	Ea5_	0	1	0	
01010	0	0	0	1	0	J'	Ea5·Ea6	Ea6_·Ea5	Ea5_	0	1	1	
01001	0	0	0	1	0	J'	Ea5·Ea6	Ea6_·Ea5	Ea5_	1	0	0	
00110	0	0	0	1	0	J'	Ea5·Ea6	Ea6_·Ea5	Ea5_	1	0	1	
00101	0	0	0	1	0	J'	Ea5·Ea6	Ea6_·Ea5	Ea5_	1	1	0	
00011	0	0	0	1	0	J'	Ea5·Ea6	Ea6_·Ea5	Ea5_	1	1	1	
11100	0	0	0	0	1	K'	Ea6 xor Ea5	Ea6_ + Ea5	Ea5_	0	0	0	286a
11010	0	0	0	0	1	K'	Ea6 xor Ea5	Ea6_ + Ea5	Ea5_	0	0	1	
11001	0	0	0	0	1	K'	Ea6 xor Ea5	Ea6_ + Ea5	Ea5_	0	1	0	
10110	0	0	0	0	1	K'	Ea6 xor Ea5	Ea6_ + Ea5	Ea5_	0	1	1	
10101	0	0	0	0	1	K'	Ea6 xor Ea5	Ea6_ + Ea5	Ea5_	1	0	0	
10011	0	0	0	0	1	K'	Ea6 xor Ea5	Ea6_ + Ea5	Ea5_	1	0	1	
01110	0	0	0	0	1	K'	Ea6 xor Ea5	Ea6_ + Ea5	Ea5_	1	1	0	
01101	0	0	0	0	1	K'	Ea6 xor Ea5	Ea6_ + Ea5	Ea5_	1	1	1	

Post Inversion Logic

Invert Results of sub-word a decode if W5subCh_c=1

Invert decoded value for sub-word a if the weight of sub-word c equals 5

290a

FIG. 19

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Decode Mux Truth Table Sub-word b													
Eb4-0	Decode Path Mux Control					Block		Db5	Db4	Db3	Db2	Db1	Db0
	Gbs	Hbs	Fbs	Jbs	Kbs								
10000	1	0	0	0	0	G'		0	0	0	0	0	0
01000	1	0	0	0	0	G'		0	0	0	0	0	1
00100	1	0	0	0	0	G'		0	0	0	0	1	0
00010	1	0	0	0	0	G'		0	0	0	0	1	1
11101	0	1	0	0	0	H'		1	1	1	1	0	0
11011	0	1	0	0	0	H'		1	1	1	1	0	1
10111	0	1	0	0	0	H'		1	1	1	1	1	0
01111	0	1	0	0	0	H'		1	1	1	1	1	1
11000	0	0	1	0	0	F'		Eb5	Eb5	Eb5	Eb5_	0	0
10100	0	0	1	0	0	F'		Eb5	Eb5	Eb5	Eb5_	0	1
01011	0	0	1	0	0	F'		Eb5	Eb5	Eb5	Eb5_	1	0
00111	0	0	1	0	0	F'		Eb5	Eb5	Eb5	Eb5_	1	1
10010	0	0	0	1	0	J'		Eb5-Eb6	Eb6_	Eb5_	0	0	0
10001	0	0	0	1	0	J'		Eb5-Eb6	Eb6_	Eb5_	0	0	1
01100	0	0	0	1	0	J'		Eb5-Eb6	Eb6_	Eb5_	0	1	0
01010	0	0	0	1	0	J'		Eb5-Eb6	Eb6_	Eb5_	0	1	1
01001	0	0	0	1	0	J'		Eb5-Eb6	Eb6_	Eb5_	1	0	0
00110	0	0	0	1	0	J'		Eb5-Eb6	Eb6_	Eb5_	1	0	1
00101	0	0	0	1	0	J'		Eb5-Eb6	Eb6_	Eb5_	1	1	0
00011	0	0	0	1	0	J'		Eb5-Eb6	Eb6_	Eb5_	1	1	1
11100	0	0	0	0	1	K'		Eb6 + Eb5	Eb6_	Eb5_	0	0	0
11010	0	0	0	0	1	K'		Eb6 + Eb5	Eb6_	Eb5_	0	0	1
11001	0	0	0	0	1	K'		Eb6 + Eb5	Eb6_	Eb5_	0	1	0
10110	0	0	0	0	1	K'		Eb6 + Eb5	Eb6_	Eb5_	0	1	1
10101	0	0	0	0	1	K'		Eb6 + Eb5	Eb6_	Eb5_	1	0	0
10011	0	0	0	0	1	K'		Eb6 + Eb5	Eb6_	Eb5_	1	0	1
01110	0	0	0	0	1	K'		Eb6 + Eb5	Eb6_	Eb5_	1	1	0
01101	0	0	0	0	1	K'		Eb6 + Eb5	Eb6_	Eb5_	1	1	1

Post Inversion Logic

Invert Results of sub-word b decode if $W5subCh_c + W2subCh_a = 1$

$W5subCh_c = Kcs \cdot Ec6 \cdot Ec5 + Hcs \cdot (Ec6 + Ec5)$

$W2subCh_a = Jas \cdot Ea6_Ea5_ + Gas \cdot (Ea6_ + Ea5_)$

Invert decoded value for sub-word b if
the weight of sub-word c = 5 and/or the
weight of sub-word a = 2

290b

FIG. 20

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Decode Mux Truth Table Sub-word c												
Ec4-0	Decode Path Mux Control					Block						
	Gcs	Hcs	Fcs	Jcs	Kcs		Dc5	Dc4	Dc3	Dc2	Dc1	Dc0
10000	1	0	0	0	0	G'	$Ec6_ + Ec5_$	0	0	$Ec5_$	0	0
01000	1	0	0	0	0	G'	$Ec6_ + Ec5_$	0	0	$Ec5_$	0	1
00100	1	0	0	0	0	G'	$Ec6_ + Ec5_$	0	0	$Ec5_$	1	0
00010	1	0	0	0	0	G'	$Ec6_ + Ec5_$	0	0	$Ec5_$	1	1
11101	0	1	0	0	0	H'	1	1	1	$Ec5_$	0	0
11011	0	1	0	0	0	H'	1	1	1	$Ec5_$	0	1
10111	0	1	0	0	0	H'	1	1	1	$Ec5_$	1	0
01111	0	1	0	0	0	H'	1	1	1	$Ec5_$	1	1
11000	0	0	1	0	0	F'	$Ec5$	$Ec5$	$Ec5$	$Ec5_$	0	0
10100	0	0	1	0	0	F'	$Ec5$	$Ec5$	$Ec5$	$Ec5_$	0	1
01011	0	0	1	0	0	F'	$Ec5$	$Ec5$	$Ec5$	$Ec5$	1	0
00111	0	0	1	0	0	F'	$Ec5$	$Ec5$	$Ec5$	$Ec5$	1	1
10010	0	0	0	1	0	J'	$(Ec5 \text{ xor } Ec6)_$	$Ec6_ \cdot Ec5$	$Ec5_$	0	0	0
10001	0	0	0	1	0	J'	$(Ec5 \text{ xor } Ec6)_$	$Ec6_ \cdot Ec5$	$Ec5_$	0	0	1
01100	0	0	0	1	0	J'	$(Ec5 \text{ xor } Ec6)_$	$Ec6_ \cdot Ec5$	$Ec5_$	0	1	0
01010	0	0	0	1	0	J'	$(Ec5 \text{ xor } Ec6)_$	$Ec6_ \cdot Ec5$	$Ec5_$	0	1	1
01001	0	0	0	1	0	J'	$(Ec5 \text{ xor } Ec6)_$	$Ec6_ \cdot Ec5$	$Ec5_$	1	0	0
00110	0	0	0	1	0	J'	$(Ec5 \text{ xor } Ec6)_$	$Ec6_ \cdot Ec5$	$Ec5_$	1	0	1
00101	0	0	0	1	0	J'	$(Ec5 \text{ xor } Ec6)_$	$Ec6_ \cdot Ec5$	$Ec5_$	1	1	0
00011	0	0	0	1	0	J'	$(Ec5 \text{ xor } Ec6)_$	$Ec6_ \cdot Ec5$	$Ec5_$	1	1	1
11100	0	0	0	0	1	K'	$Ec6 + Ec5$	$Ec6_ + Ec5$	$Ec5_$	0	0	0
11010	0	0	0	0	1	K'	$Ec6 + Ec5$	$Ec6_ + Ec5$	$Ec5_$	0	0	1
11001	0	0	0	0	1	K'	$Ec6 + Ec5$	$Ec6_ + Ec5$	$Ec5_$	0	1	0
10110	0	0	0	0	1	K'	$Ec6 + Ec5$	$Ec6_ + Ec5$	$Ec5_$	0	1	1
10101	0	0	0	0	1	K'	$Ec6 + Ec5$	$Ec6_ + Ec5$	$Ec5_$	1	0	0
10011	0	0	0	0	1	K'	$Ec6 + Ec5$	$Ec6_ + Ec5$	$Ec5_$	1	0	1
01110	0	0	0	0	1	K'	$Ec6 + Ec5$	$Ec6_ + Ec5$	$Ec5_$	1	1	0
01101	0	0	0	0	1	K'	$Ec6 + Ec5$	$Ec6_ + Ec5$	$Ec5_$	1	1	1

Post Inversion Logic

Invert Results of sub-word b decode if W2subCh_a = 1

$W2subCh_a = Jas \cdot Ea6_ \cdot Ea5_ + Gas \cdot (Ea6_ + Ea5_)$

Invert decoded value for sub-word c if
the weight of sub-word a = 2

290c

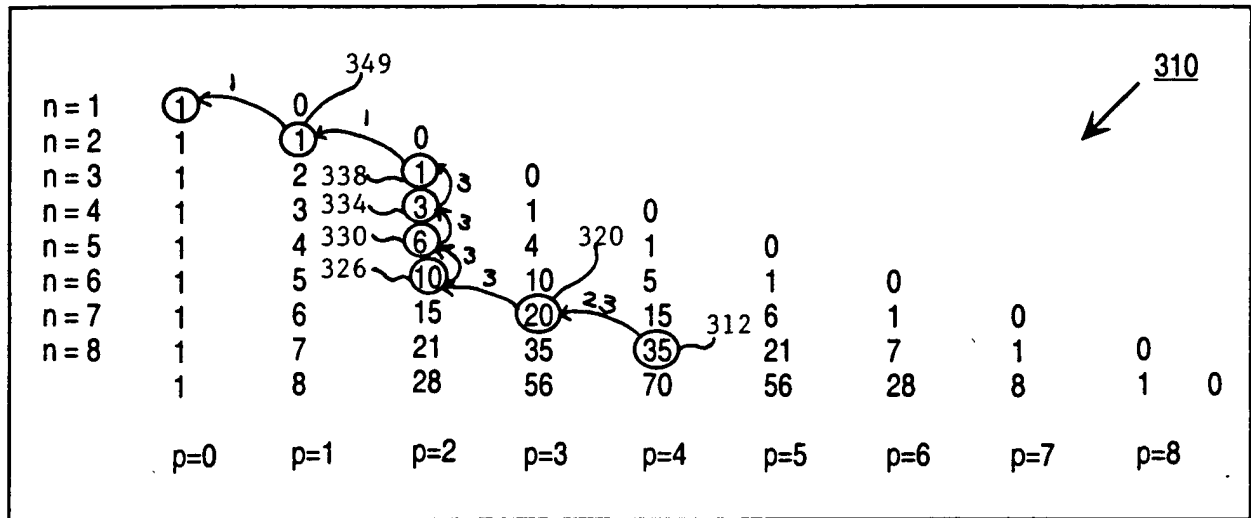
FIG. 21

302

(4B/6L EXAMPLE)
CORRESPONDENCE BETWEEN
DECIMAL, BINARY, AND ENCODED VALUES

304 DECIMAL VALUE	306 BINARY VALUE	308 ENCODED VALUE
DECIMAL COUNT	BINARY COUNT	BINOMIAL COUNT
0	0000	000111
1	0001	001011
2	0010	001101
3	0011	001110
4	0100	010011
5	0101	010101
6	0110	010110
7	0111	011001
8	1000	011010
9	1001	011100
10	1010	100011
11	1011	100101
12	1100	100110
13	1101	101001
14	1110	101010
15	1111	101100
16	EXTRA	110001
17	EXTRA	110010
18	EXTRA	110100
19	EXTRA	111000

FIG. 22



$$n_p = \frac{(n (n-1) (n-2) \dots n-[p-1])}{1 \cdot 2 \cdot 3 \dots p} \quad 310a$$

$$58_{10} = 11000110 \quad 310b$$

FIG. 23